

Maryland Native Warm-Season Grass 2007 Forage Trial Report

SUMMARY

There are many species and varieties of native warm-season grasses available that are currently being used or have the potential to be used in Maryland to provide valuable summer forage in rotational grazing systems. Many of these varieties have been selected for forage and/or for other uses in areas far from Maryland such as the Midwest and comparative yield performance under Maryland growing conditions is lacking. To better utilize these grasses, more forage productivity data is needed for specific growing regions. Maryland farmers would benefit from a greater knowledge of the performance of these native warm-season grass varieties when grown in Maryland. Forage production information will help farmers to optimize production in a sustainable manner that will conserve natural resources and benefit their bottom line.

A native warm-season grass forage variety trial is being conducted by the NRCS and University of Maryland to provide the latest information on agronomic performance when grown in Maryland in a simulated rotational grazing system. This report summarizes data collected from the trials that will be of mutual benefit to the farmers of Maryland and surrounding states, the seed industry, the Maryland Cooperative Extension and NRCS.

The warm-season grass forage variety trial was planted June 16, 2005 at the USDA Natural Resources Conservation Service (NRCS), National Plant Materials Center located on the Beltsville Agricultural Research Center at Beltsville, Maryland. Seed dealers and distributors and grass breeders were invited to submit entries of released varieties, or advanced breeding lines that they would like evaluated in Maryland. However there were no privately developed varieties entered into the trial and there were none known to exist at the time. All of the varieties entered in this trial are varieties developed and released by public agencies. Included in this study are a total of 36 varieties or selections of eastern gamagrass, switchgrass, big bluestem, indiagrass, little bluestem, Florida paspalum, and coastal panicgrass.

The data in this study will be used to refine the grazing models in the C-Graze software that used in planning managed grazing systems. The warm-season grass varieties evaluated in this trial are listed, with the rates they were seeded, in table 1.

Experimental Design and Conduct

The trial was planted in a randomized complete block with four replications. Plot size is 3 ft. × 20 ft. with yield measurements taken from the entire plot area. Stand ratings were recorded to capture information for establishment and persistence. The trial will continue for a minimum of four years (stands permitting) as a simulated grazing system. Cuttings were made using a Carter

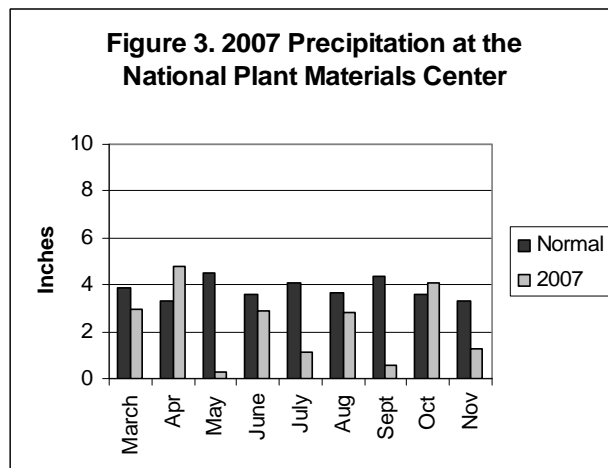
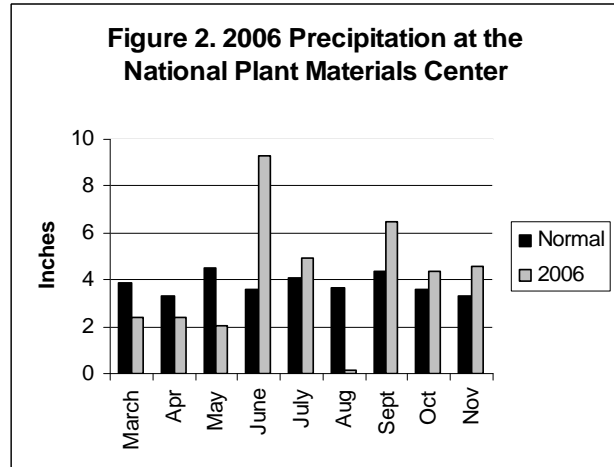
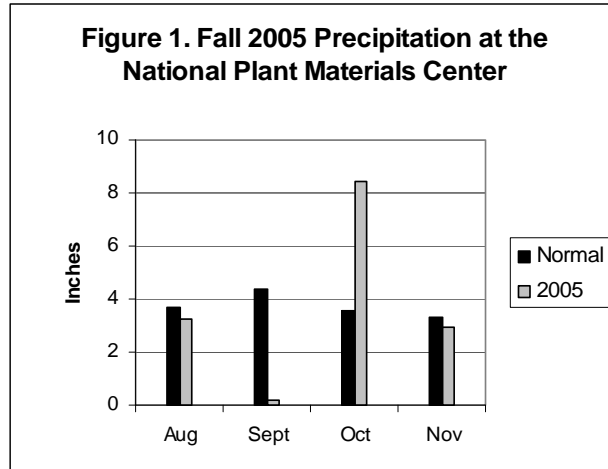
flail-type harvester and cut to a height of 8 inches, when some of the grasses began to have reached the mid to late boot stage. Stand ratings were recorded to capture information for establishment and persistence. The plots were not harvested until 2007 to allow grasses to fully establish. Nitrogen was applied at a rate of 60 pounds of available nitrogen in April.

Table 1. Warm-season Grass Varieties and Seeding Rates

Scientific Name	Common Name	Release Name	#PLS/acre
<i>Andropogon gerardii</i>	big bluestem	‘Kaw’	10
<i>Andropogon gerardii</i>	big bluestem	‘Niagara’	10
<i>Andropogon gerardii</i>	big bluestem	‘Rountree’	10
<i>Andropogon gerardii</i>	big bluestem	Oz-70 Germplasm	10
<i>Andropogon gerardii</i>	big bluestem	Southlow Michigan Germplasm	10
<i>Andropogon gerardii</i>	big bluestem	Suther Germplasm	10
<i>Panicum amarum</i>	Coastal Panicgrass	‘Atlantic’	10
<i>Panicum virgatum</i>	switchgrass	‘Blackwell’	8
<i>Panicum virgatum</i>	switchgrass	‘Carthage’ Germplasm	8
<i>Panicum virgatum</i>	switchgrass	High Tide Germplasm	8
<i>Panicum virgatum</i>	switchgrass	‘Kanlow’	8
<i>Panicum virgatum</i>	switchgrass	‘Shawnee’	8
<i>Panicum virgatum</i>	switchgrass	‘Shelter’	8
<i>Panicum virgatum</i>	switchgrass	Southlow Michigan Germplasm	8
<i>Panicum virgatum</i>	switchgrass	‘Cave in Rock’	8
<i>Paspalum floridatum</i>	Florida paspalum	MD 9078766	8
<i>Schizachyrium scoparium</i>	little bluestem	‘Cimarron’	8
<i>Schizachyrium scoparium</i>	little bluestem	‘Aldous’	8
<i>Schizachyrium scoparium</i>	little bluestem	‘Blaze’	8
<i>Schizachyrium scoparium</i>	little bluestem	Dune Crest Germplasm	8
<i>Schizachyrium scoparium</i>	little bluestem	‘Camper’	8
<i>Schizachyrium scoparium</i>	little bluestem	Suther Germplasm	8
<i>Schizachyrium scoparium</i>	little bluestem	Southlow Michigan Germplasm	8
<i>Sorghastrum nutans</i>	Indiangrass	‘Osage’	10
<i>Sorghastrum nutans</i>	Indiangrass	‘Americus’	10
<i>Sorghastrum nutans</i>	Indiangrass	MD unreleased	10
<i>Sorghastrum nutans</i>	Indiangrass	‘NE-54’	10
<i>Sorghastrum nutans</i>	Indiangrass	NY unreleased	10
<i>Sorghastrum nutans</i>	Indiangrass	‘Rumsey’	10
<i>Sorghastrum nutans</i>	Indiangrass	Southlow Michigan Germplasm	10
<i>Sorghastrum nutans</i>	Indiangrass	Suther Germplasm	10
<i>Sorghastrum nutans</i>	Indiangrass	‘Holt’	10
<i>Tripsacum dactyloides</i>	eastern gamagrass	‘Highlander’	10
<i>Tripsacum dactyloides</i>	eastern gamagrass	‘Pete’	10
<i>Tripsacum dactyloides</i>	eastern gamagrass	‘Meadowcrest’	10
<i>Tripsacum dactyloides</i>	eastern gamagrass	‘Verl’	10

Weather

The precipitation amounts by monthly total for the trial period growing seasons are reported in Figures 1 through 3. In the 2007 growing season there was overall below average precipitation and extremely low precipitation in the months of May, July and September. The droughty conditions did noticeably stress the grasses causing significant leaf rolling, and could be significant factor influencing yield in the 2007 season.



Interpreting Data and Stand Scores

Summary of yields and stand scores are reported in Table 2. Varieties are grouped according to species and are ranked according to yield performance for this year.

The stand score provides a useful measure of persistence. The stand score is a visual estimate of groundcover that is contributed by the planted variety. The stand score scale is from 1 to 100 with 1 equaling no plants of the seeded species/variety present and 100 equaling complete cover of plants of the seeded variety.

Data presented in Table 2 can be used to evaluate relative performance in 2007. Comparisons can be statistically evaluated by using the LSD (Least Significant Difference). The LSD value represents the amount of yield which varieties must differ by in order to determine whether the difference between varieties could have happened by chance alone. The value for coefficient of variation (CV) is a measure of the relative variation. In forage trials the CV for yield is typically between 5 and 15 percent. Uncontrollable or immeasurable variations in soil type, soil fertility, soil moisture and environmental factors contribute to increased CV values. Soil type and moisture variations within the plot area of this trial were undoubtedly major contributors to the increased CV values of this trial.

Yield data from plots with less than 50% stand were not included in the analysis. Varieties that were not included in the data analysis due to consistently poor stands of less than 50% include 'Kaw' big bluestem, Oz-70 Germplasm big bluestem, Southlow Michigan Germplasm switchgrass, and Suther Germplasm little bluestem.

For 2007, the five most productive varieties were 'Carthage' switchgrass, 'Atlantic' coastal panicgrass, 'Kanlow' switchgrass, 'Cave in Rock' switchgrass, and 'Shawnee' switchgrass, listed in order of most productive first. Eastern gamagrass, Florida paspalum, and coastal panicgrass continued growth later than other species, providing the greatest late season yield.

Table 2. Yield comparison of warm-season forage cultivars by harvest date and season total at the USDA-NRCS National Plant Materials Center, Beltsville, Maryland, 2007.

Species/Variety	Forage Yield (lb/acre)				Stand 6/22/07
	Jul 9	Sept 6	Nov 8	Season Total	
Big Bluestem					
Suther Germplasm	1051	944	94	2089	76
'Rountree'	1185	530	23	1737	86
'Niagara'	838	306	6	1149	77
Southlow Michigan Germplasm	643	204	3	849	62
Coastal Panicgrass					
'Atlantic'	5894	3360	679	9934	76
Switchgrass					
'Carthage'	6997	2679	115	9790	90
'Kanlow'	5263	2963	78	8303	66
'Cave in Rock'	4732	2174	57	6963	75
'Shawnee'	4585	1974	107	6666	71
'Blackwell'	4060	1742	77	5879	76
'Shelter'	2207	1345	55	3608	60
Hightide Germplasm	2543	688	61	3293	63
Florida Paspalum					
MD unreleased 9078766	3003	2363	307	5672	86
Little Bluestem					
'Cimarron'	3279	1234	74	4587	82
'Camper'	1992	542	30	2564	81
'Aldous'	1742	624	44	2410	86
'Blaze'	982	275	11	1268	79
Southlow Michigan Germplasm	849	195	24	1068	74
Dune Crest Germplasm	603	402	56	1060	80
Indiangrass					
'Americus'	2874	1500	152	4525	92
'Osage'	3190	1203	111	4503	90
Suther Germplasm	2569	1244	93	3906	89
'Rumsey'	2041	768	61	2869	90
'NE-54'	1766	559	61	2386	87
NY unreleased	1337	634	24	1995	79
MD unreleased	1143	588	45	1776	87
Southlow Michigan Germplasm	1061	341	11	1412	67
'Holt'	864	221	nh ^{1/}	1085	83
Eastern Gamagrass					
'Highlander'	2213	959	270	3442	73
'Meadowcrest'	1766	937	171	2873	85
'Verl'	2001	735	129	2864	60
'Pete'	1457	780	140	2377	77
Mean	2398	1094	102	3591	78
LSD ^{1/} _(0.05)	1413	505	95	1705	16
% CV ^{2/}	42	33	42	34	15

1/ = least significant difference test at 5% level of probability; 2/ = coefficient of variation

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